

This method of operating will be available under all circumstances, but is only proposed for the removal of the body of the bone, or any portion of it anterior to the angles. If the mouth should be small, and the diseased mass too large to be brought through entire, it will be very easy to divide it near the symphysis, or elsewhere, as the judgment of the surgeon may determine, and remove a piece at a time. Of course, where the jaw has to be disarticulated, the *curvilinear incision*, first suggested and executed by our distinguished countryman, Dr. Mott, will always be indispensable.

ART. VI.—*Observations on Yellow Fever.* By E. H. KELLY, M. D., of Mobile, Ala.

AMONG the diseases of common occurrence in various portions of the world, which, from their fatality and the discrepancy of opinion that exists as to their true character, and proper mode of treatment, demand a more close and accurate investigation, may be ranked the Yellow Fever.

The difference of opinion which prevails among medical writers in relation to the pathology and therapeutical management of this disease, may, in part, be attributed to the circumstance of the more intense grades of remittent, or miasmatic fever, which are endemic in the same localities, and at the same seasons with the yellow fever, having been, in many instances, mistaken for the latter, but which, however closely they may resemble it, in many of their leading symptoms, differ from it essentially in character.

Having had, during a practice of sixteen years, in the cities of New Orleans, Charleston, and Mobile, ample opportunities of studying the yellow fever in all its grades, from the mildest to the most malignant, I have thought it would not be uninteresting to record the results of my observations. However imperfect these may be esteemed, they may nevertheless be useful as materials for the formation of a more exact history of the disease, than are most of those with which we have been furnished by European writers.

The yellow fever may be defined to be a distinct form of continued fever, consisting of a single paroxysm, varying in duration, but without any true remission from its commencement until its close. This single paroxysm may terminate favourably, in rapid and complete convalescence, or unfavourably, in a state of collapse followed by death.

In many cases, however, the first paroxysm of fever, when it terminates without the occurrence of collapse, leaves the organism in a state of susceptibility, that renders it peculiarly liable to a recurrence of fever. This consecutive fever is to be viewed as the result of the derangement of

the secretory functions—of visceral obstructions, or of a chronic inflammation of certain of the tissues, the sequelæ of the violent action existing during the first paroxysm—it is hence, a true epiphrenomena.

It is this occasional recurrence of fever which has probably induced a few medical writers to attribute to yellow fever a true remittent or even intermittent character.

Although the disease possesses but very few essential, or strictly diagnostic symptoms, still these few are sufficiently pathognomonic to enable us to recognize the yellow fever, with great certainty, as a peculiar and distinct affection. They are—the turgidity of the vessels of the conjunctiva; the swollen suffused appearance of the eyes, and their pink, or red, muddy, or glassy appearance—giving to the countenance, in many cases, a drunken, besotted expression, which is, to a certain extent, characteristic. In the aged, from the intense redness of the adnata, and the dryness of the conjunctiva, the eyes assume a peculiar staring and ferocious aspect. There is always in the yellow fever a peculiar anxiety in the expression of the countenance, approaching to what is observed in tetanus, and which differs from that common in the more malignant forms of remittent fever. The lower eyelid is in some cases dark and swollen, as if blood were effused into its tissue. There is pain in the forehead and orbits, not diffused, as in bilious fever, and rarely extending even to the temples. There are, also, pains in the knees and calves of the legs with cramps, the latter being more remarkable in this than in the other forms of fever. An intolerable rachialgia is also a marked and peculiar symptom. There is increased sensibility of the epigastrium, with irritability of stomach and vomiting, the matters discharged consisting simply of the ingesta, or of a glairy fluid, rarely of bile.

The mental as well as physical powers become rapidly and greatly reduced. Great restlessness and jactitation are more severe than in almost any other fever. The tongue is often swollen, pointed, dry, and with crimson edges; it is coated throughout with a layer of a pasty consistence, or the coating terminates in a yellow fur towards its base. From the intumescence of the tongue, the pressure of the teeth gives to its edge a festooned appearance. Its papillæ become separated, and, as the disease advances, deep fissures appear to penetrate its substance.

The peculiar acid alliaceous odour of the breath, and the dark-coloured stools described by Louis, and which are distinguished from the dark dejections of typhoid fever by the absence of diarrhoea, meteorism, and stupor, are among the characteristics of yellow fever. The dark discharges peculiar to this disease, are never observed in cases of gastritis, from which the yellow fever differs essentially in its pathological character.

Ptyalism is more readily induced in yellow fever, than in the bilious remittent fever. The burning, acrid sensation in the stomach, the nausea, and the vomiting in the more advanced stage of the disease, are more pecu-

liarly distressing than in the other forms of fever—and the matter resembling the colluvies of port wine, or coffee grounds, discharged from the stomach in yellow fever, differs from the dark discharges from the stomach occasionally observed in the former.

The yellow colour of the surface, which has been regarded as pathognomonic, confined in some cases to the conjunctiva, the nose, lips, and ears, while, in others, it extends over the surface generally, varies from a pale lemon hue, in patients of a fair complexion, to a deep orange, in those who are naturally sallow.

A torpor more or less marked of the cutaneous capillaries, evinced by the slow return of the blood when pressed out by the finger, as if these vessels were in a state of passive hyperæmia, has been referred to as characteristic of yellow fever. I have myself observed it.

A special characteristic of yellow fever is the immunity from a second attack which those enjoy who have once been affected with the disease. Persons, on the other hand, who have experienced an attack of bilious fever acquire an increased susceptibility to its recurrence.

That yellow fever is not simply an aggravated form of bilious fever, is evident from the fact that the two diseases seldom prevail together; and that when both do occur simultaneously, the mortality of bilious fever is not increased. In 1824, '28, '37, '38, '39 and '40, when the yellow fever prevailed in Charleston, no cases of bilious fever were observed; the same fact was observed during the prevalence of the yellow fever in 1832, '33 and '35 in New Orleans, and in 1837 and '39 in Mobile. In 1840 and '41, however, the city of Mobile continued particularly healthy, while the surrounding country was very sickly.

While the yellow fever is only of occasional occurrence in many parts of the Southern States, an attack of bilious remittent of a most obstinate and malignant character, is endangered by sleeping for a single night, during the autumn, in these same localities, even in persons who are perfectly proof against the occurrence of the yellow fever.

According to Dr. Stevens, in bilious fever the blood, at the commencement of the disease, is cupped and sity, which is not the case in yellow fever; in the latter disease, also, the serum has been observed to be of a deep orange colour.

Another characteristic of yellow fever is the fact recorded by Pym, Smith, and others, that its invasion occurs, in four-fifths of the cases, at night, and without the rigor by which fevers of a miasmatic origin are ushered in.

The foregoing circumstances, with the additional circumstance that, while the yellow fever is an endemic of the island of Barbadoes, where the bilious remittent fever has never prevailed epidemically, and that it prevails almost every year at Vera Cruz, in the neighbourhood of which no marshes exist, prove very clearly that the disease is a distinct and peculiar form of fever.

Indeed, so strongly marked is the diagnosis between yellow fever and the bilious remittent fever, that I have never found any difficulty in distinguishing the two diseases, unless the attack of the first was very mild, or occurred in children, in whom fever is often masked.

The supervention of yellow fever on an intermittent, or remittent, with the supposed mingling, in this manner, of their types, has been adduced as an evidence of the identity of the two diseases, and that the only difference is in their intensity. Such an argument is about as valid as it would be to infer the identity of small-pox and measles, from the fact that the first may supervene upon the latter.

It was a common occurrence, during the prevalence of the cholera at New Orleans, in the autumn of 1832, for a person to be attacked with yellow fever, and before, or as soon as the febrile excitement ceased, for the patient to be seized and quickly destroyed by the cholera in its most marked and malignant form. Yet no one inferred from this that the two diseases were identical in their nature.

A person may have been, as is known to be frequently the case, attacked with a chill, followed by a fever of an intermittent or remittent type, several months before the occurrence of an epidemic of yellow fever; during the latter, he is seized with a chill, supra-orbital pains, rachialgia, &c. These symptoms he supposes to be merely a recurrence of the disease under which he had been previously labouring. He nevertheless confesses that his sufferings are greater than they were before; and his fever, instead of continuing for six or twelve hours, or, if longer, with marked exacerbations and remissions every day, lasts, without any very manifest remission, for from thirty-six to seventy-two hours, and then terminates favourably, or in a state of collapse, with black vomit, &c. Now the question is, are the latter symptoms to be considered as indicating merely a recurrence or continuance, in a more aggravated grade of the original disease, or do they not rather mark the occurrence of a new and distinct affection?

I have invariably remarked that, whenever yellow fever supervenes during an attack of intermittent or remittent fever, the characteristic symptoms of the latter disease are immediately and entirely lost, and a new set of symptoms take their place; the fever is no longer marked by intermissions or remissions, and every thing indicates that we have to do with a very different affection from that which previously existed.

Without attempting to point out every unimportant symptom that may occur in the various grades of yellow fever, I shall confine myself to a description of the two modifications of the disease which are most generally met with; and which modifications may be referred to a difference in the temperament and susceptibilities of the individuals attacked, as well as to a difference in the intensity of the cause by which they are produced.

The phrases *inflammatory* and *congestive*, being those in common use, may be adopted to indicate the two modifications referred to.

The first, or inflammatory form, as it has been denominated, may or may not be ushered in by a chill; which, when it occurs, is soon succeeded by increased heat of the surface, and a sense of soreness or dull pain, with increased arterial action, throbbing of the carotids and temporal arteries, and a quick, full, tense, and strong pulse. The patient complains of acute supra-orbital pain, and severe rachialgia; a sense of anxiety and constriction, and of intolerable heat at the praecordia. He is desirous of cool air, and driuks. There soon occurs more or less nausea, which constantly increases, and terminates at length in a distressing retching or vomiting. The characteristic black vomit may occur at this early stage, but very rarely does. The abdomen becomes tense and tender upon pressure, from which the patient recoils with horror depicted upon his face. The conjunctivæ of the eyes become deeply injected and suffused; the face is flushed, the tongue swollen, flabby, and indented at its edge; its centre is coated with a yellow, or brownish fur, while the sides are of a deep crimson. The surface of the body is parched, and quickly assumes a yellow hue; occasionally, however, the skin is moist. The countenance has an anxious, gloomy, sad or impatient expression. There is great confusion of mind. The bowels are usually torpid, and difficult to move, and the urine is high-coloured and scanty.

This first stage lasts from four to twenty-four, thirty-six, or seventy hours. its average duration being about forty hours; when the second stage, which Lining denominates the stadium without fever, ensues. The pulse now appears natural, though somewhat weak; the eyes are less red, and have more of a yellow tinge; the pains of the head, back and loins, diminish; the skin becomes cooler, sometimes moist, but the moisture is unequally distributed over the surface, or confined to particular portions of it. The pain and sense of burning at the epigastrium diminish. The vomiting, which continues at intervals, is attended with less effort. The tongue is still coated with a dry, brown fur, cracked in the centre, with red edges, or it may become entirely or nearly clean. There occurs, in fact, so complete an improvement, in appearance, of all the more violent symptoms, that it is well calculated to deceive those who are unacquainted with the disease. The patient, in fact, declares that he feels well, and has often an appetite for food. He may even get out of bed, shave and dress himself, and, as I have known to occur, drink with his friends in congratulation of his fortunate escape from "the claws of Yellow Jack." But if, amid all this calm, he be closely observed, there will be detected a peculiar jactitation, and when he smiles, a risus sardonicus. He will often crave some crude and unwholesome food, as raw bacon, &c. There is also a propensity to deceive in his answers to your questions, which may lead, unless you are on your guard, to a false prognosis. If the peculiar lemon tint has not already spread

over the whole surface, you may detect it along the course of the vessels of the face, where, by looking carefully in an oblique direction, it will be readily observed.

This stage lasts from twelve to thirty hours, and glides gradually into the third stage. The symptoms of disease become more and more marked, and the prostration augmented; the pulse becomes rapid, unequal, and depressed; the patient faints on being raised from the recumbent posture; the skin assumes a bronzed or mahogany hue, which disappears when pressure is made with the finger, but slowly returns when the pressure is removed; the tongue is swollen, moist, and indented at the edges, and covered with a brown fur, having a darker streak along the median line; I have as often, however, seen it clean, with a very slight pasty coating, or of a deep fiery red, and occasionally bloody or dry, black, and cracked; the mouth, lips, and nostrils being covered with a similar dark-coloured exudation. There is acute pain at the epigastrium, especially during vomiting, which is without effort, or during hiccough. The matters discharged from the stomach, which were before simply the ingesta mixed with mucus, are now a dark-coloured flocculent fluid, varying in hue from a slate, to a dark-greenish, or chocolate colour, being often brownish, resembling muddy coffee. What are termed fly, or bees' wings, are now observed in the matters vomited; these are caused by the reflection of the light upon globules of mucus, to which are adherent particles of a black colour. The surface of the body is cold and clammy; black, acrid, and offensive discharges take place involuntarily from the bowels. Towards night the patient is usually affected with delirium; sometimes low and muttering, at others furious. Suppression of urine, hemorrhage from all the natural outlets, sighing, orthopnoea, vomiting, or eructations of an offensive gas, singultus, subsultus tendinum, convulsions and coma, usually precede death. Among the symptoms of this latter stage, intolerance of light, petechiae, meteorism, &c., which, according to Gilkrest, are not liable to occur, are enumerated by Professor Harrison in the *New Orleans Journal*.

In the congestive form of yellow fever, the peculiar shrunken, ghastly, mottled, or ashy appearance of the features, in this modification of the disease, would seem to indicate a speedy termination in death, at the very onset of the attack. The eyes have a dull, red, glassy look; there is in some cases a dilatation of the pupils. The countenance has a sullen expression. The tongue is pasty, with patches of white fur, its edges and apex being red. There is but little vascular excitement, the pulse being weak and soft, or natural. Musgrave has known the pulse to be as slow as 44 in the minute.

The attack is generally sudden, and the prostration from the very onset of the disease such as to disable the strongest individual from retaining the erect posture. Giddiness, stupor and general lethargy quickly supervene, the patient often falling asleep even when you are questioning him. In

many cases there is delirium either of a transient character, or terminating in coma. The patient is usually taciturn; he utters no complaint, but still presents indications of suffering; or he may be entirely insensible, with his eyes wide open, and exhibiting great restlessness. Gilkrest states that he has known a lividity and coldness of the extremities, equal to what are met with in cholera asphyxia, to be present, while the chest and abdomen were preternaturally hot. The skin, in most cases, becomes bronzed, or communicates to the hand, when it is touched, a peculiar repulsive sensation. The epigastrium is tender to the touch, and hiccup, hemorrhage, and suppression of urine early occur. The discharges from the bowels are small, white, or resembling pus, and have a peculiar odour; or they may be of a pea-green colour, but, in general, indicate a deficiency of bile. The occurrence of the black vomit is soon followed by death. When the lungs are particularly affected, we have lividity of countenance, soreness of the throat, orthopnoea, &c. The black vomit is sometimes preceded by singultus. The tongue presents, occasionally, an appearance as though seared with a hot iron. The stools are sometimes of a gelatinous consistence. In some cases a low monotonous wailing is heard a short time before death; the patient covers himself with the bed clothes, and is incapable of answering questions. If he is disturbed, he will endeavour to bite, scratch, and kick with great fury. When a copious hemorrhage takes place from either of the natural outlets, the black vomit and suppression of urine are less liable to occur, and when neither yellowness of the surface nor hemorrhage precedes death, another train of symptoms occurs indicative of more extensive congestion. The patient is extremely restless, deranges the bed-clothes, lays with his head over the side of the bed, and exhibits that peculiar state of indifference so common in persons labouring under sea-sickness. The tongue is dry, the papillæ are separated by deep fissures, the pulse is feeble and intermitting; there is a twitching or tremulous motion of the mouth and tongue, and, in some rare cases, trismus.

In the adynamic variety of yellow fever, which occurs in persons of deficient vital power, we have a somewhat different train of symptoms. The circulation, in these cases, is depressed; there are confusion of thought, dimness of vision, and severe headache. A sense of chilliness is succeeded by one of burning heat, under the arms and on the inside of the thighs. The pulse is small and weak, the eyes dingy, the skin of an olive hue, and spotted with vibices and petechiae; profuse hemorrhages speedily ensue, and death takes place within four or five days. In some instances I have met excoriations about the nose, mouth, scrotum, anus and penis, a gangrenous appearance of blistered surfaces, hemorrhage from leech-bites, anthrax, buboes, and infiltration of venous blood in muscular parts.

A curious feature of yellow fever is exhibited in what have been termed the walking cases. The disease, in such cases, proceeds so insidiously, that the first indication of danger, sometimes of the attack, is the appear-

ance of the black vomit. An instance of this kind occurred in New Orleans in 1833. A Frenchman complained of being unwell. He consulted a medical friend, one of his own countrymen, to whose residence, about a mile distant from his own, he walked every day. On the fourth day of his attack I was called to him, and the first thing which met my view was the black vomit. Coma and death soon followed. Another case was related by Dr. R., formerly a respectable physician of New Orleans, but now deceased. A man came into his office, and said that his friends had persuaded him to consult a physician, although he himself believed there was no occasion for it; whilst conversing he asked for a basin, and threw up a large quantity of the black vomit. Now, in all such cases that have fallen under my observation, the disease had proceeded through its several stages; but the symptoms were of a less open and decided character. A late writer infers that the attack takes place, or that the disease is developed at the moment when its characteristic phenomena become fully manifested; but this opinion I cannot adopt until the evidences of its accuracy are adduced. In the Guzerat fever, described by Gibson of the Bombay medical department, although the debility and extreme prostration occurred rapidly, nevertheless the disease is stated to have passed through its regular stadia.

Prognosis.—In forming our opinion of the probable result in a case of yellow fever, the age, constitution and residence of the patient, and the character of the prevailing epidemic, must all be taken into consideration. The symptoms which indicate an unsavourable result are a state of general depression taking place immediately upon the attack, or occurring suddenly at an early stage. The early appearance of a yellowness of the surface, similar, as Gilkrest remarks, to what occurs on ecchymosed parts, a line of yellowness from the nose to the pubis, or an olive or dark hue of the skin, is, likewise, unsavourable. Louis states that a loss of warmth in the extremities, with a relaxed and moist condition of the skin, occurs simultaneously with the black vomit. The other unsavourable symptoms are a weak, irregular pulse, deep sighing, severe pain, and an intolerable burning at the epigastrium and along the course of the œsophagus, and a shrivelled state of the hands, as in cholera. Suppression of urine was considered by Rush as a fatal symptom; a free secretion is not invariably, however, a favourable indication. Strangury is generally, but not always, favourable. A red protuberant eye, with dilatation of the pupil, is a very unsavourable symptom. The tongue being clean and red, or covered with a dirty brown fur, tremulous, or black and hard, with dark-coloured sordes adhering to the teeth and lips, is always indicative of danger. Hemorrhage from the nasal or buccal membrane, if it occur in the early period of the fever, is generally a favourable symptom. Vibices and petechiæ are, in the majority of cases, associated with great depression of the pulse and nervous system; still, like hemorrhage, they may be connected with a state of reaction. Incessant vomiting, and small whitish stools, having a sour odour, or bistre or clay-

coloured dejections, tenesmus, involuntary discharges from the bowels, are indications of approaching dissolution. Bloody stools, like the washings of beef, are generally favourable; but when black, grumous, and offensive, and associated with typhoid symptoms, they are decidedly bad. Gilkrest states, that an impacted state of the skin is always an indication of danger. A knitting of the eyebrows, a scowling, sinister look of the countenance, with an expression of horror when pressure is made upon the epigastrium, more jactitation, obstinate hiccup, subsultus tendinum, and the black vomit, are usually followed speedily by coma and death.

A state of pregnancy is always very unfavourable. "*Mulierem uteres gerentum morta quo quam acuto corripi iefbale.*"—HIPP. So, also, of the venereal desire.

A favourable prognosis may be founded on the pulse retaining sufficient strength after the third day; the skin becoming warm and soft; the vomiting, and the pains in the eyes, back and limbs, ceasing; the appearance of bile in the stools, which assume a greenish gelatinous consistence; and the occurrence of natural, quiet sleep.

Delirium, unattended with stupor, and a diffused pain in the head, are not to be considered as unfavourable symptoms.

When the fever is preceded by a decided rigour, the case is more hopeful than when no chill is experienced, the more malignant cases being seldom ushered in, as Rush remarks, by a cold stage. The tongue being covered with a light fur, indicates remaining vigour of constitution. The medical commissioners, Pariset, Francois, and Bally, who investigated the disease at Barcelona, in 1821, agreed that generally diffused, spontaneous sweats, with an abundant secretion of urine, were among the most favourable indications during that epidemic.

Anatomical Appearances.—In consequence of the settling of the blood towards the more depending portions of the body after death, the back of the neck, chest, abdomen, and the posterior portions of the extremities, assume a dark, purple hue, while the rest of the body is generally of a mottled, dusky yellow colour; and the scrotum, ears and extremities are of a darkish brown. A line of pale mottled yellow can be detected extending from the nose to the pubis. The muscles are dark and easily torn; the cellular membrane has a white, but unnatural appearance. These phenomena have led to the erroneous supposition that a rapid decomposition of the body ensues after death.

In the brain the dura mater is studded with dark spots and patches of lymph. A yellow serous effusion sometimes exists beneath the arachnoid. The substance of the organ itself is ordinarily firm, with increased fullness of its vessels. The choroid plexus presents often the appearance of a coagulum of blood. Dark-coloured blood is frequently met with at the base of the brain. Louis remarked, that in rapid cases of the fever the pia mater was deeply injected with blood, while, in the more chronic cases,

serous effusion was met with. Professor Harrison remarks, in the New Orleans Journal, that the lungs do not collapse as usual when the sternum is raised. These organs are usually found covered with dark-coloured patches, the tissues being here so completely infiltrated with blood, as to constitute, in many cases, a state of splenification. The heart, like the other muscles, is dark coloured and readily torn; coagula are frequently detected, especially in the left ventricle, which, in malignant cases, are very friable. The peritoneum has lost its smooth, silvery appearance, and has a dirty yellow colour. The mucous membrane of the œsophagus is often eroded, with the appearance, at its cardiac extremity, of a black matter, similar to that vomited, having oozed from its surface. Louis questions whether there is any connection between the burning sensation, experienced during life in the course of the œsophagus, and the erosion of its lining membrane, detected after death.

The stomach is usually distended with an inodorous gas, and contains a dark-coloured matter similar to that of the black vomit, more rarely, a pale viscid fluid, with dark-coloured flakes floating in it. The matter of the black vomit can, in some cases, be pressed out of small canals running beneath the villous coat. The vessels of the organ are usually gorged with blood, especially at the cardiac extremity, or its mucous membrane presents simply increased redness, of a rose hue, with streaks or spot of a purple colour in different directions along its inner surface. Abrasions and small depressions, as though a portion of the tissue had been removed, are often detected.

The congested state of the gastric vessels presents, not unfrequently, an appearance similar to that described by Seeds and others, as being met with in animals that have been strangulated, or criminals who have been executed. It may hence be inferred, that the injection of the vessels, in cases of yellow fever, is due to a loss of contractility, in consequence of which they are unable to resist the entrance of an undue amount of blood, or to empty themselves when distended. The mucous membrane of the stomach is often mamelonated, but there is seldom any indication of thickening, softening, ulceration, or gangrene. I have met with softening in only one case; and Louis detected a thickening of the membrane in only two cases. Hepatization and sphacelus are mentioned by the latter, but by no other pathologist that I am aware of.

The same remarks as have been made in reference to the morbid appearances in the stomach, may be repeated in regard to the duodenum. The small intestines generally present similar lesions; their mucous surface is usually covered with a dark-coloured viscid mucus, and presents numerous arborescences of a yellow hue. Intussusceptions would seem to be of common occurrence in yellow fever. Gilkrest remarks that no ulceration of the glands of Peyer has been detected as in "typhus and other fevers

mali moris." In cases, however, assuming a typhoid type, enlargement and softening of these bodies have been present.

In the large intestines, especially the colon, the mucous membrane is often coated with a dark pultaceous matter. A pale, red fluid, resembling blood, is sometimes met with in their cavity; contractions of their calibre are occasionally present. On removing the black pasty matter from the mucous membrane, its surface is often found smeared with a substance resembling linseed meal and water. Louis witnessed, in one case, a softening of the colon, which was covered with an adventitious membrane.

The condition of the liver, both internally and externally, is varicous. Its colour may be either pale, reddish, brown, olive, yellow, greenish, or it may have the appearance of rotten cork. In children it usually resembles, in colour, pale box-wood. It may be hard, or soft and friable, crumbling between the fingers. It is often engorged, and, in some cases, anemic. Louis considers the pale anemic condition of the liver pathognomonic of yellow fever. According to Dr. Stewardson, of Philadelphia, in bilious fever the liver has a bronzed appearance externally, and an olive tint internally, which never occurs in yellow fever. The gall-bladder contains, ordinarily, its usual quantity of bile; Louis, however, says that it contains less than in other acute diseases; it is sometimes thickened, its contents being orange-coloured, or tinged with blood. The mucous surface is frequently punctated and covered with a granular sediment from the bile. It has been known to contain, in some cases, a grumous, tar-like, or ink-coloured fluid. The biliary ducts, especially, according to the observations of Stevens, the cystic, are sometimes impervious.

The kidneys are, occasionally, of a yellow colour externally, their substance congested, with minute abscesses in the papillæ, and pus in the ureters. The urinary bladder is generally contracted, its coats being thickened and indurated, and its mucous surface covered with yellow mucus, and dotted with small points. A substance resembling black vomit has been found in its cavity.

In cases of yellow fever terminating rapidly in death, no lesions have been observed: Louis states that in eight out of twenty cases, he met with no lesions to account for the fatal termination.

In regard to the black vomit, which has been considered pathognomonic of yellow fever, Professor Dickson states that he has met with it in cases of gastritis, enteritis, and in catarrhal and bilious remittent fever, in one case of varioloid, in two of dropsy, and in pregnancy; and the late Dr. P. G. Prioleau, of Charleston, South Carolina, states that he has met with the ejection of a matter resembling the black vomit in pregnant women labouring under no disease, and in a youth after extreme fatigue. I have seen the same occurrence in the moment of death from phthisis pulmonalis. In yellow fever the black vomit generally occurs in the second stage of the disease, though occasionally in the first. I have known it to occur within

thirty hours of the attack, and have heard of it occurring still earlier. In regard to its nature, Dr. Rush supposed it to be vitiated bile. Fordyce considered it to be an exudation similar to that producing the incrustations upon the tongue, lips, and teeth, in malignant fevers. The majority of physicians, with Dr. Physick, believe it to be blood, altered in appearance from certain morbid causes. Professor Dickson doubts its being blood, from having never met with it in *hæmatemesis*. Dr. Rhee, in a drop of black vomit, examined by the solar microscope, discovered an immense congeries of animalculi. Dr. Jackson asserts that he has traced it from the gall-bladder to the stomach, when the pyloric orifice was contracted. Louis believes that it may be produced by other surfaces than that of the stomach, having met with it in the intestines. Dickson has seen it in the bronchi, and by others it has been met with in the urinary bladder.

The black vomit varies in appearance, being occasionally grayish brown, chocolate coloured, or blackish, in some being as black as the secretion from the cuttle-fish. It has been compared to coffee-grounds, the liquor of pickled walnuts, &c. When examined with the microscope, it looks like smoky mica, and has its colour and feel. According to Louis, the deeper the colour of the black vomit, the more abundantly it is secreted. Dr. J. C. Nott, (*Amer. Journ. of Medical Sciences*, April, 1845,) considers the black vomit to be the blood acted upon by an acid, and that in proportion to the excess of the acid or the blood, the colour will be darker or lighter. Dr. Nott states that the black vomit effervesced when the carbonate of potass or ammonia was added to it. In the experiments which I have made, no effervescence occurred in a single instance. Bancroft declares that the black vomit is perfectly insipid, which corresponds with my own experiments. In only one-sixth of the cases of yellow fever which fell under my notice, were there any indications of acidity of stomach.

The appearance of the artificial black vomit, formed according to the plan of Dr. Nott, differs materially from that ejected from the stomach. The latter has a flaky appearance, like smoky mica; the former more of the coffee-ground appearance.

To a small portion of black vomit about four times the quantity of sulphuric ether was added, and then shaken together in a vial; the matter of the vomit floated on the surface, having the appearance of a dark cobweb or flake of dead matter. A portion of artificial black vomit being treated in the same manner, it immediately sank to the bottom, and did not again rise to the surface. Treated with a solution of the nitrate of silver, the black vomit was changed to a cream-white colour, every dark speck being removed, while the artificial substance retained its colour, being precipitated to the bottom of the vessel. An argument against the hypothesis that black vomit is blood changed by the action of an acid, may be drawn from the case of Dr. Fletcher, Dr. Nott's own patient, who, he remarks, was ejecting black vomit from the stomach, and discharging *pure blood*.

from the bowels at the same time. Now, how is it to be explained that the supposed acid secretions acted upon the blood in the stomach and not in the intestines? The black vomit is doubtless a morbid excretion from the vessels of the stomach and intestines, and in this sense may be described as the blood changed in its properties by the diseased condition of the vessels.

Causes.—It is unphilosophical to refer a disease which, like yellow fever, is epidemic only at particular seasons and in particular localities, to causes which are in operation every year, and in localities where the disease never occurs.

That yellow fever is not produced by the action of marsh miasmata, must be very evident, from the fact that it is unknown at Rio Janeiro, but endemic at Vera Cruz, both places being nearly parallel in latitude, both built on a low sea coast, skirted by high mountains; and the religion, habits, and manners of living of the inhabitants of both being the same. Still, at Rio Janeiro, though encompassed by extensive swamps, and the inhabitants constantly subject to attacks of intermittent and remittent fever, the yellow fever has never been observed; while at Vera Cruz it occurs almost every year. In Honduras, bordering on the sea, and alternately boggy during the rainy season, or parched up during the severe droughts so common in that country, yellow fever never prevails, while intermittents and remittents are of common occurrence. In Demarara, with its low and swampy soil, its ditches, its stagnant water, abounding with vegetable matter in a state of decomposition, the whole constituting a true hot-bed of pollution, the yellow fever is unknown. Where are we to look for the sources of paludal miasmata as the cause of yellow fever in Bulam, surrounded by the sea, on the peak of Medina Sidona, on the Rock of Gibraltar, or in the beautiful and apparently salubrious city of St. Pierre, Martinique? Carlotta, in Spain, a beautiful village, 1200 feet above the level of the sea, regularly built, well paved, and exceedingly cleanly, was nearly depopulated in 1800 by the yellow fever. Barcelonette, surrounded very nearly by the sea, and without any marshes in its immediate vicinity, was decimated in 1821 by this pestilence. We might also inquire why the yellow fever should not prevail in Calcutta, Milo, Algiers, and Constantinople, where everything would appear to be present necessary for its production, and yet commit such ravages in the well-regulated cities of Charleston, New Orleans, &c.?

Bilious remittent fever is met with alike in the swamps and rice fields of the Southern States, amid the fens of Lincolnshire, in Carthaginiæ, Savoy, amid the fertile plains of Lombardy, and in the island of Walcheren; but the yellow fever never prevails in any of these situations, a circumstance scarcely to be expected, if it depended for its origin upon the action of the same morbid causes.

It has been asserted that the prevalence of a high degree of atmospheric temperature is essential to the production of yellow fever, and a series

of meteorological tables has been adduced to show that the disease has not prevailed, excepting when the thermometer has ranged from 79° to 80° F. at 3 o'clock, P. M., and it has been supposed that the prevalence and malignancy of the disease are always in proportion to the degree of the prevailing heat beyond that just indicated.

Now, although the prevalence of a certain degree of heat is unquestionably necessary for the production of yellow fever, it is nevertheless true that the disease does not occur in situations and seasons marked by very high degrees of temperature. If heat alone were sufficient for the production of yellow fever, it is somewhat remarkable that it has never occurred in the city of Kingston, Canada, or in various parts of Russia, where the temperature of the summer is often beyond the degree supposed to favour its generation.

The supposition that the yellow fever is produced by a poison generated by the action of intense heat upon masses of vegetable or animal matter, in a state of putrescence, is equally untenable: all the circumstances supposed to be necessary for the generation of the poisonous effluvia, have been repeatedly present without the fever occurring; while, on the other hand, it has appeared and prevailed extensively, under circumstances where the materials for the production of this supposed poison could not possibly have had an existence.

The influence of an easterly wind has been much insisted upon, as a cause of this and other epidemics, and I believe with some show of reason. Johnson observed that the yellow fever was most prevalent, whenever the trade wind blew to some extent. These winds extend as far as 28° or 30° on each side of the equator, blowing from east to west; and on the coast of Asia and America, are sometimes felt as far as 40°. The yellow fever broke out in New York, in 1798, during an easterly wind. The epidemic at Gibraltar, in 1804, was by many referred to the same cause. The prevalence of easterly winds was observed by Barton during the prevalence of yellow fever at New Orleans in 1833, and by Kirkpatrick in Woodville, in 1844. I have observed the same thing during the epidemics of 1839, '42 and '43.

By a few writers, the yellow fever, in common with other epidemical diseases, has been referred to the existence of particular species of animalculæ, which exist in impure air, and by entering the circulation, give rise to disease. These animalculæ are supposed to be destroyed by pure air and water, and hence are found in the air of cities, but not in that of the country. But, if yellow fever were produced by animalculæ, why should not the acclimated be as liable to its attacks as the unacclimated, and why should children be less frequently attacked than adults, when we know that parasitic animals are more commonly met with in the first than in the last.

The peculiar condition of the air essential to the production of the yellow fever has not yet, and probably never will be, certainly ascertained.

Various causes, no doubt, tend, by producing a vitiation of the atmosphere, to augment the potency of the particular reigning epidemical constitution. But it is impossible by these alone to account for the occurrence of the various epidemics during particular years, and the confinement of many of them to particular districts or localities, or to explain the progress of the epidemic to its maximum intensity, and its more or less gradual decline and final cessation for a time. These circumstances, as well as the special character of each epidemical disease, must be due to some condition of the atmosphere, in addition to its state of impurity or intemperies; some specific morbid peculiarity appertaining to different sections of the globe, which, with the combined influence of heat, moisture, animal and vegetable putrefaction, electrical changes, the prevalence of particular winds, &c., develops, by its action upon the animal organism, local epidemics; the tetanus of Santa Cruz, the Barbadoes leg, the pellagra of Lombardy, the goitre of the Alps, &c. &c.

In looking over the map of the world, we see in countries north and south of the equator, but chiefly north, as far as 40° , three great regions of disease. First, of the plague; secondly, of the cholera; and, thirdly, of the yellow fever. If all the morbid circumstances were precisely the same in all of these regions, only one of the diseases named would probably prevail, but as there is a modification in these circumstances, there is also a variety in the character of the pestilence engendered.

Thus, from the equator to 20° north latitude, may be regarded as the true yellow fever region, embracing the West Indies, and the coast towns of Africa, the United States, Mexico, &c. From 20° to 30° in the eastern hemisphere, we find the valley of the Ganges, the principal centre of the cholera region, and from 30° to 40° we have the region of the plague.

The yellow fever being, therefore, endemic within the tropics, we can see no grounds for the belief that, when the fever makes its appearance in different portions of the same region, it is necessary that it should be exported from the one place to the other by the crews, cargoes, or foul air of ships.

It has been supposed that the plague, yellow fever, Asiatic cholera, and typhus fever are mere modifications in the character of one and the same disease, produced by the influence of the peculiar epidemic constitution of the atmosphere in different regions of the earth. In corroboration of this supposition, it is stated by Sydenham, that a disease similar to the plague occurred in London, and in 1771, a disease of a like character prevailed in Moscow in —, where it destroyed 80,000 persons. Again, a fever similar to the yellow fever has been observed in England and Ireland. Dr. Hamilton, of Lyn Regis, describes its appearance in Norfolk, and Graves in Dublin. The latter states that the symptoms and anatomical characters were the same as those laid down in cases of yellow fever by the best authorities. Sydenham describes the plague of London, in 1665, as having been ushered in by a malignant fever, which was nearly identical with typhus fever.

Dr. Armstrong states that a friend of his from the pest house at Constantinople, visited the fever hospital under his charge. He took him to the bed-side of a patient labouring under typhus fever, and asked him what he denominated the disease; he replied, the plague. I have myself met with at least a dozen cases of yellow fever in New Orleans, and Mobile, during the years 1833, '37, '39 and '43, that might with great propriety have been denominated cases of plague. They were marked by a low grade of fever, and attended with buboes, carbuncles, &c. The same thing was observed in New York, in 1798. Armstrong mentions a case of typhus in a female, attended with knotty glands, petechiae, &c. Baron Larrey states his opinion that the plague and yellow fever are identical. Boot remarks that, the yellow fever, which is annually epidemic at Vera Cruz, becomes changed into typhus at Boston;—the two diseases occurring, the first in the south, and the second in the north, at the same seasons. He has seen the symptoms peculiar to each blended in the same patient.

If we examine closely the plague and yellow fever, we find a corresponding train of symptoms in both. The same anxiety at the praecordia; a similar expression of countenance; the shuddering; the pain of the epigastrium; the vomiting of dark fluids; hemorrhages; dark, bloody and offensive stools. We observe, also, that both have a predilection for towns on the sea-coast, and for similar conditions of soil, &c. We read of walking cases of the plague having occurred in the army of Napoleon. A similar parallel may be drawn between yellow fever and typhus fever.

Why the peculiar modifications of disease which we have supposed to be endemic in particular regions of the earth, should be occasionally met with beyond those regions, it is impossible to explain. It may be that, in consequence of the prevalence of certain winds, an unusual condition of the temperature and of the electric condition of the air, and perhaps of other changes connected with certain intestinal movements in the earth itself, the atmosphere of one region may undergo a modification approximating it, in its constitution and morbid influence, to that of another, and thus impressing upon the diseases occurring there the same character, as though they had originated in the latter. But everything in relation to this subject, in the present state of our knowledge, can be viewed only as a more or less plausible conjecture.

Nature of Yellow Fever.—By a reference to the account of the pathological changes observed after death, it will be perceived that upon them can be founded no positive evidence in proof of the dependence of the disease upon local inflammation. The increased vascularity and congestion of certain tissues, and the effusions which often exist, cannot with propriety be referred to as the products of inflammation. Stevens supposed that the poison producing the disease, causes a change in the condition of the blood, rendering it dark-coloured, and deficient in its saline ingredients, and making it to coagulate without a crust. These changes in the blood, when

present, I consider as rather the effect than the cause of the morbid actions set up in the body; they are not, however, invariably present; I have seen the blood coagulate as perfectly in yellow fever as in an ordinary intermittent.

With Gilkrest, I feel persuaded that it is upon the ganglionic and spinal system of nerves that the poison producing yellow fever primarily and mainly acts. This is evidenced by the morbidly augmented sensibility, the general malaise, acute pains, sudden prostration, &c., which often usher in the disease. The first effect of the morbid impression upon the nerves, is functional disorder of the several organs, which, if the cause be not removed, and the healthy action of the nerves restored by appropriate remedies, terminates finally in disease of the several tissues; the blood and other fluids of the body become changed, and a breaking up of the whole organism necessarily ensues.

Treatment.—The general indications of treatment are: 1st. To remove the febrile excitement, and thus prevent the supervention of local congestion and of lesions of the structures and fluids of the body. 2d. To guard against the occurrence of collapse; and, 3d, when the febrile excitement is reduced, to maintain the powers of the system. To fulfil the first indication, venesection has been strongly advocated by some physicians of very great eminence, and as strongly condemned by others of equal authority. Upon the whole, however, the weight of evidence is decidedly in opposition to the use of the lancet. That it may have been found beneficial in particular epidemics, is very probable, but I question very much whether, under any circumstances, the abstraction of blood will be found beneficial after the very first stage of the disease has passed.

Cold affusion, as directed by Professor Dickson, that is, immediately upon the termination of the chill, if there be one, when the face becomes flushed, and the surface preternaturally hot and dry, I have found, in the few instances in which I have tried it, to produce a beneficial impression. Whenever there is chilliness, dyspnoea, or diarrhoea present, the cold affusion is inadmissible. Cold applications to the head give much relief from pain, and are often otherwise useful. They are to be employed under the same circumstances as the cold affusion.

A remedy more generally applicable, even in the second stage of the disease, and attended always with less risk, is the warm or tepid bath. The patient should be allowed to remain in the bath from ten to fifteen minutes, during which time friction should be made to his body and extremities. (The Creoles use split lemons for this purpose.) Upon being taken from the bath, the patient should be quickly enveloped in a warm blanket, and put to bed. I have generally repeated the warm bath daily, so long as the strength lasts.

The exhibition of cathartic remedies is generally approved of; but to prove advantageous, they should be resorted to without the least delay. I

prefer as a cathartic, a combination of calomel and compound extract of jalap and colocynth, given in pills. If by these the bowels are not speedily relieved, injections are to be resorted to.

The Dover's powder has often the effect of moderating the heat of the surface, allaying nervous irritability, and inducing sleep.

Mercury, early administered, and in doses calculated to produce as speedily as possible, its specific effects upon the system, has been viewed by many distinguished physicians as a remedy, calculated, in the majority of cases, to arrest the fatal tendency. We believe that no other remedy has an equal influence over the disease, never having known a single case in which death has occurred after salivation was established.

There is, however, as Mr. Linton remarks, a condition of the gums produced under the influence of mercury, which is often confounded with ptyalism: the peculiar mercurial fetor is perceived, the gums become spongy and tumefied, the tongue clammy, and, as I have witnessed, ulcers form upon its dorsum, as well as upon the gums; and yet, what is properly termed salivation, does not exist. It is a question whether the condition of the gums just described, results from the action of the mercury alone, or is not rather a consequence of a morbid condition of the buccal membrane, consequent upon the disease. The latter I believe to be the most probable conclusion. Under the circumstances referred to, the remedy should be suspended, and stimulants, nutritive diet and frictions at once resorted to.

I rarely continue the use of the mercury to the extent of producing ptyalism. In the majority of the cases that fell under my care during the epidemics of 1839, '42, '43 and '44, I administered the remedy in such doses as were calculated to unload the vessels of the liver and alimentary canal, and found that all its beneficial effects were evidenced, when it produced a discharge from the bowels, of green, glairy, curdled, or jelly-like stools; convalescence soon ensuing, even when the specific effects of the mercury were not evinced in its action on the gums. I proportion the doses so as to produce free bilious evacuations. So soon as this result is effected, the tongue will, in general, become moist, the febrile heat less intense, and more equally diffused; the skin softer, and of a more healthy colour. When these indications of a solution of the disease are observed, the remedy should be discontinued.

I am accustomed to combine each dose of the calomel with a minute proportion of opium, or two or three grains of Dover's powder, to prevent its running off by the bowels. Should it purge too actively, without producing dark bilious evacuations, the amount of the opium should be increased, or the cretaceous mixture, with the addition of laudanum, administered.

After the bowels have been fully evacuated at the onset of the disease, I prefer that they should remain in a somewhat inactive condition, than incur the danger, by a continuance of purgatives, of inducing frequent watery stools, which are peculiarly unfavourable in yellow fever, often producing rapid and alarming prostration.

When dark, bilious, somewhat consistent evacuations have been procured, and a general amelioration of the symptoms ensues, I trust the case to the effects of the usual febrifuge medicines, the neutral mixture, &c. But, when the stools continue light, clay-coloured, or like cream, and the general symptoms are intense, indicating imminent danger, the safety of the patient can be secured only by pursuing the untrammelled course of Chisholm. In these cases the internal and external use of mercury should be resorted to, so as to produce as quickly as possible its specific effects upon the system.

With respect to the acetate of lead, so favourably spoken of as a remedy in yellow fever by Dr. M. Irvine, of Charleston, S. C., as well as by Dr. O'Halloran and others, my experience has been limited. I have generally employed it to arrest the hemorrhages which so often prove troublesome in the disease, and under such circumstances have been much pleased with its effects. The nitrate of silver, recommended by Professor Dickson, I have also found to be a valuable remedy in cases attended with hemorrhage, in the dose of one-eighth to one-third of a grain by the mouth, or in solution as an enema.

Blisters applied to the epigastrium in the early stages of the disease, will very generally produce a beneficial impression upon the symptoms. A blister along the spine, as recommended by Mr. Liston, will often relieve the irritability of the stomach, as well as the acute pains and jactitation which form such prominent and troublesome symptoms in this disease, and induce a calm refreshing sleep. Camphor blisters have been highly recommended, and are worth a trial.

The employment of blisters should be confined to the early stages of the attack. The practice of covering the body with blisters in the latter stages of the disease, with the view of exciting the action of the capillaries, is, according to my experience, one very seldom attended with success.

The irritability of the stomach is a most distressing symptom, and often prevents anything whatever from being given by the mouth. It is all important to allay it if it be in our power. The remedy which I have found superior to all others is the bicarbonate of potassa in solution; in some cases the solution of camphor in ether will be found very promptly to calm the irritable state of the stomach. The patient should be prohibited from taking anything in the form of drink; his burning thirst being allayed by portions of ice held in the mouth. If the irritability of the stomach be attended, as is often the case, with a constipated state of the bowels, a dose of castor oil or of croton oil may be administered, and will be found to produce less irritation and exhaustion than the mildest laxative we can administer. Saline cathartics are always to be avoided, after the first stage, from their tendency to produce thin, red, muddy stools, quickly followed by a tender and tympanitic condition of the abdomen, and irritation of the brain.

The supra-orbital pain is often very intense; for its relief cups to the nape of the neck, and leeches to the temples are frequently of no avail; more benefit will, in general, be derived from sinapised pediluvia with frictions to the lower extremities. The ice cap, or cold water to the vertex, may be employed at the same time; these means failing, a blister should be applied along the spine.

To prevent the collapse which ordinarily occurs, in severe cases, about the period of the second stadium, stimulants will be required. Great judgment is, however, demanded in deciding the proper period when they should be resorted to, as well as the extent to which they should be carried. When there are no indications of cerebral congestion, as a tendency to stupor, restless delirium, a hot dry skin, flushed face, deep suffusion of the eyes, red tongue, &c., I prefer, as a stimulant, under the circumstances referred to, opium, or some one of its preparations; it is particularly adapted to cases occurring in intemperate livers, which are marked often with symptoms of delirium tremens; here large doses of the opium will be demanded. One of the great advantages resulting from the use of opium at the period when indications of an approaching collapse occur, is the state of calm refreshing repose, which it has a tendency to produce, and which, when it occurs, results often in a state of hopeful convalescence.

From alcoholic stimulants, injudiciously administered, much injury frequently results. Their use demands the utmost judgment and caution.

In the congestive form of yellow fever, the safety of the patient will depend upon the promptness with which an energetic treatment is resorted to. Here, at the very onset of the attack, hot sinapised pediluvia, frictions to the surface, sinapisms to the extremities, epigastrium and spine, followed by bags of hot sand, and stimulating enemata, should be resorted to.

By many eminent practitioners, the sulphate of quinia in doses of from twenty to sixty or eighty grains, administered in the very commencement of the attack, no matter how high the febrile excitement may be, and when rejected by the stomach in the form of enemata, has been recommended as one of the most efficient means of controlling the more malignant forms of yellow fever. My own experience is not, however, in favour of the practice referred to. I have employed the sulphate of quinia in every stage of the disease, and in sufficiently large doses, but with very doubtful advantage excepting during the apyrexia, and in cases uncomplicated with any local determination. When injudiciously administered, it appeared to me to hasten the occurrence of the black vomit.

The various remedies that have been proposed as means of arresting the black vomit, as charcoal, chloride of sodium, tannin, creasote, tincture of cantharides, &c., I have found to be entirely inefficacious; and now never administer them unless to gratify the anxious desire of the friends of the patient, that something might be done to relieve an alarming symptom.

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